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The Long Arc Lightning Simulator is part of the Electromagnetic Transient T&E Facility (EMTEF), located at Patuxent River, Md. The Long Arc development was part of the Navy's improvement and modernization program. The Long Arc Simulator is operated by the EM Transient's Branch of the E3 division and is part of the DOD Major Range Test Facility Base System. This presentation will introduce the availability of this simulator to the DOD and commercial customer.

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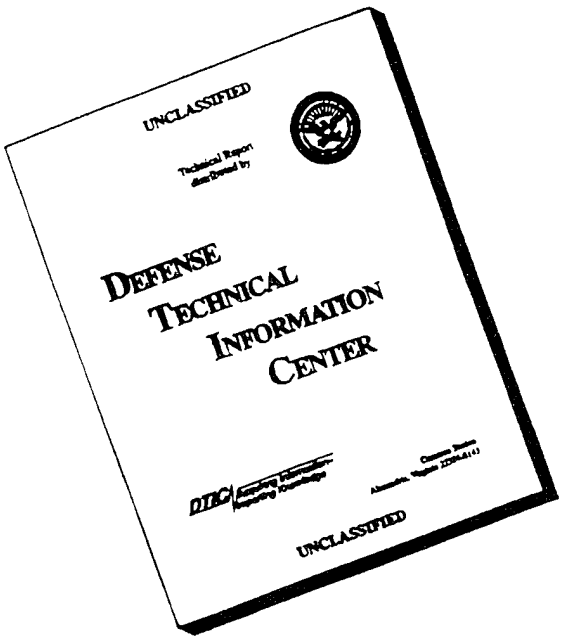

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LONG ARC LIGHTNING SIMULATOR

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Presented to the
AMEREM
28 May 1996

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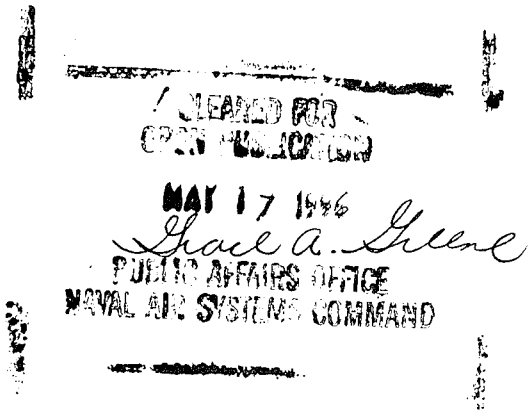
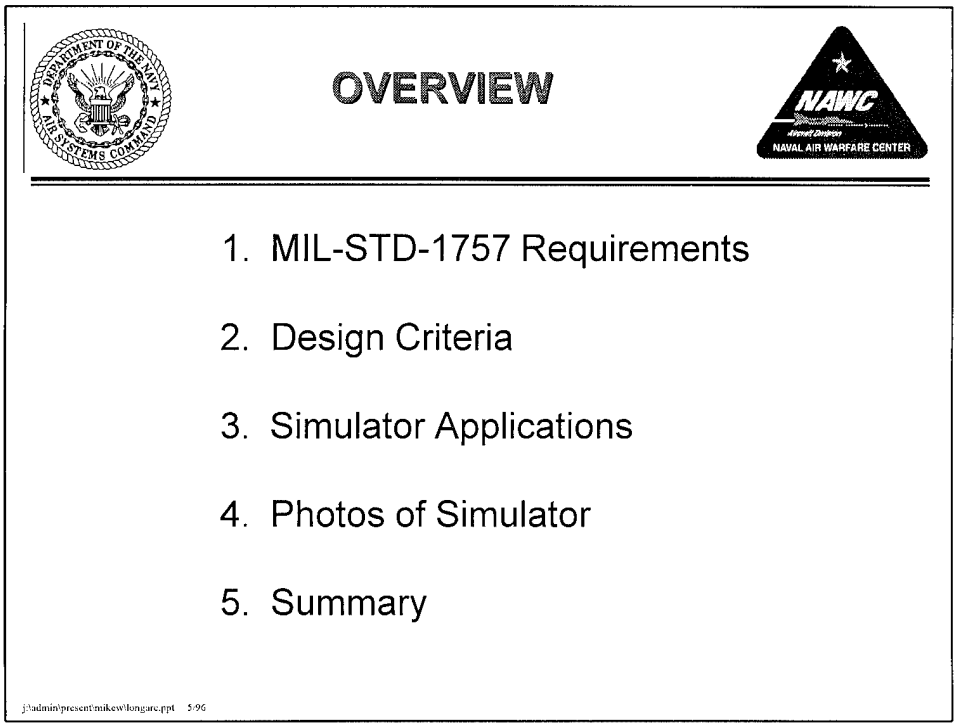
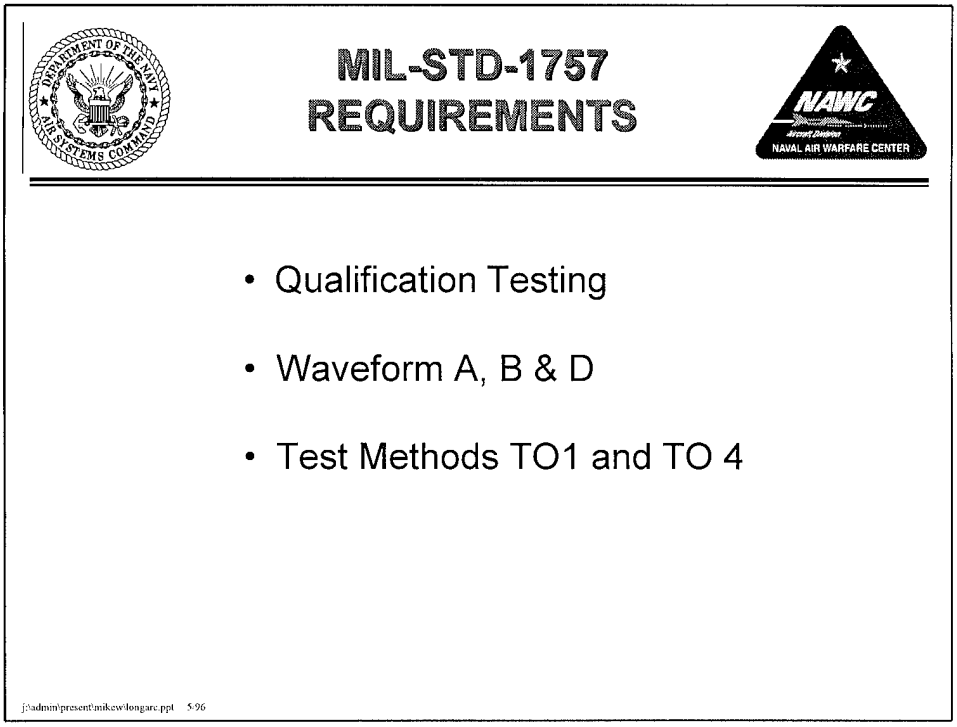




1. Today I will discuss the requirements of MIIL-STD-1757 as it refers to the Long Arc Lightning Simulator.

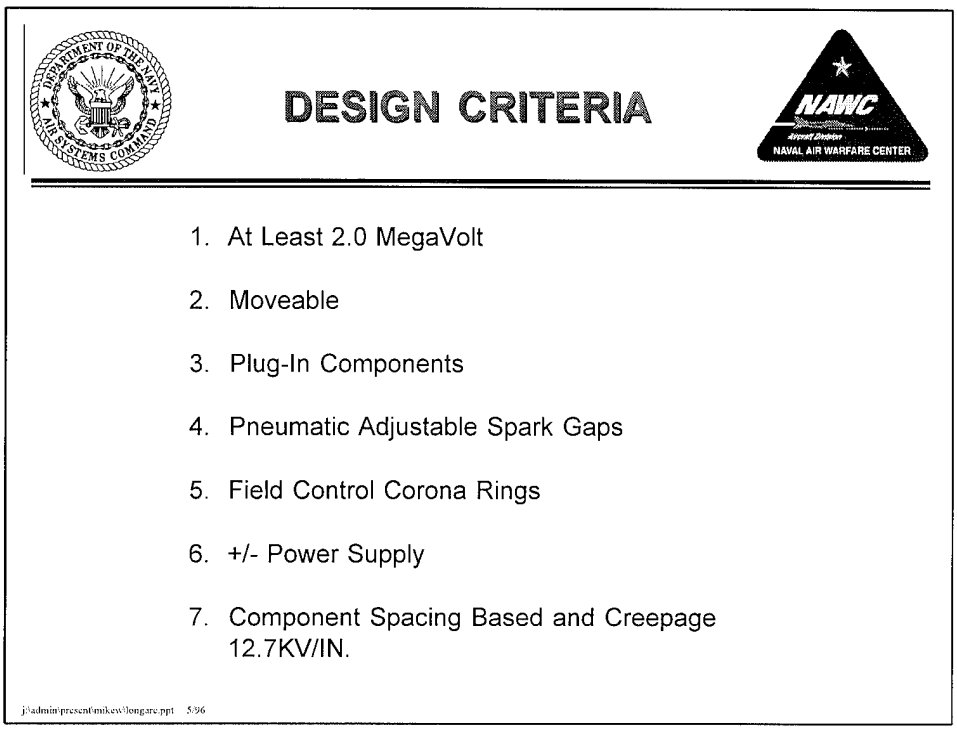
2. We will discuss our original design goals, uses for the simulator , and show some photographs of the simulator.



1. For qualification testing, there are three voltage waveforms (A, B, & D) which represent the electric fields associated with a lightning strike.

2. Voltage waveforms A and D are used to test for possible dielectric puncture and other potential attachment points. This is known as test method TO1.

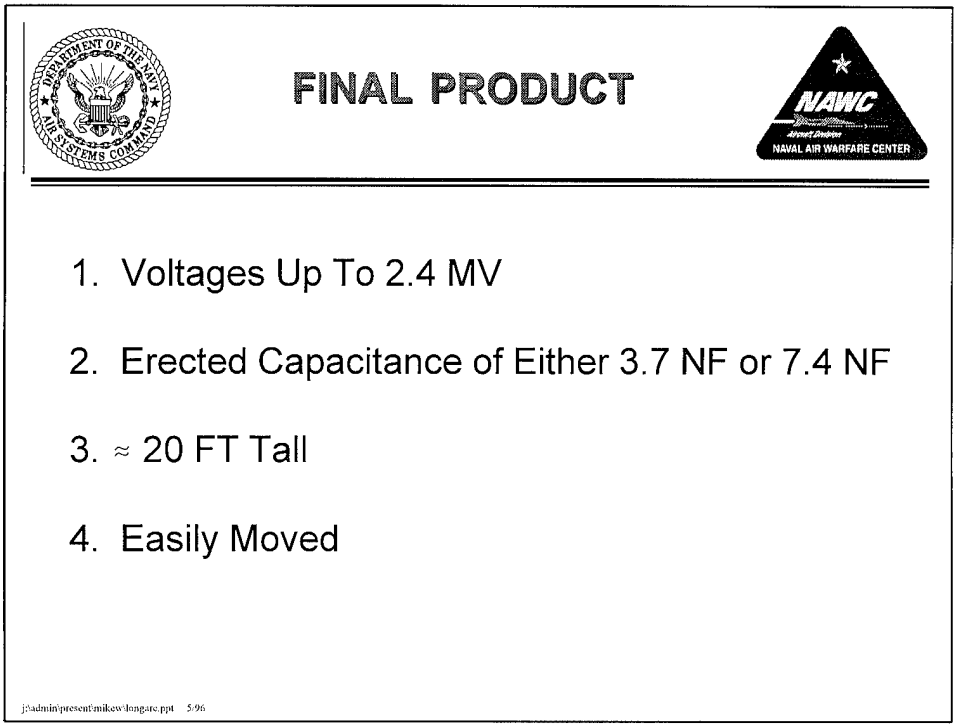
3. Voltage waveform B is used to test for streamers. This is referred to as Test Method TO4.



1. All parameters/goals were considered when simulator was designed. To save money and reduce life cycle costs, existing in house capacitor and materials were used where possible.

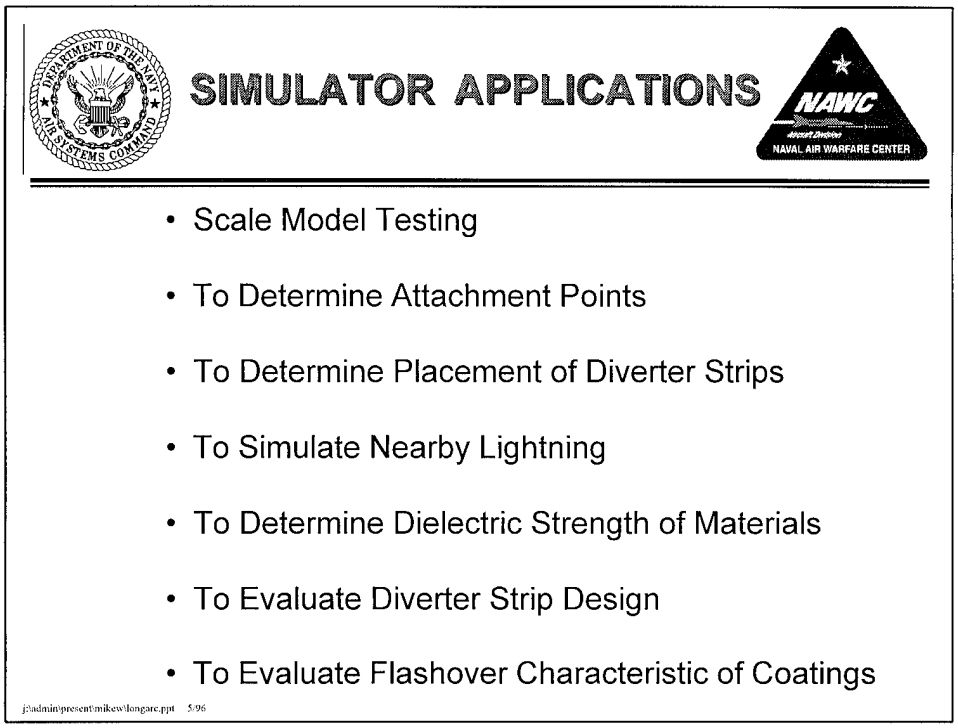
2. Simulator was designed to work in air, but possible to upgrade to a closed systems using SF_6 insulating gas. This would allow at least 3.0 MV on output.

3. Simulator design allows for removing stages for lower operating voltage and quick change out of capacitors to provide lower or higher energy in arc.



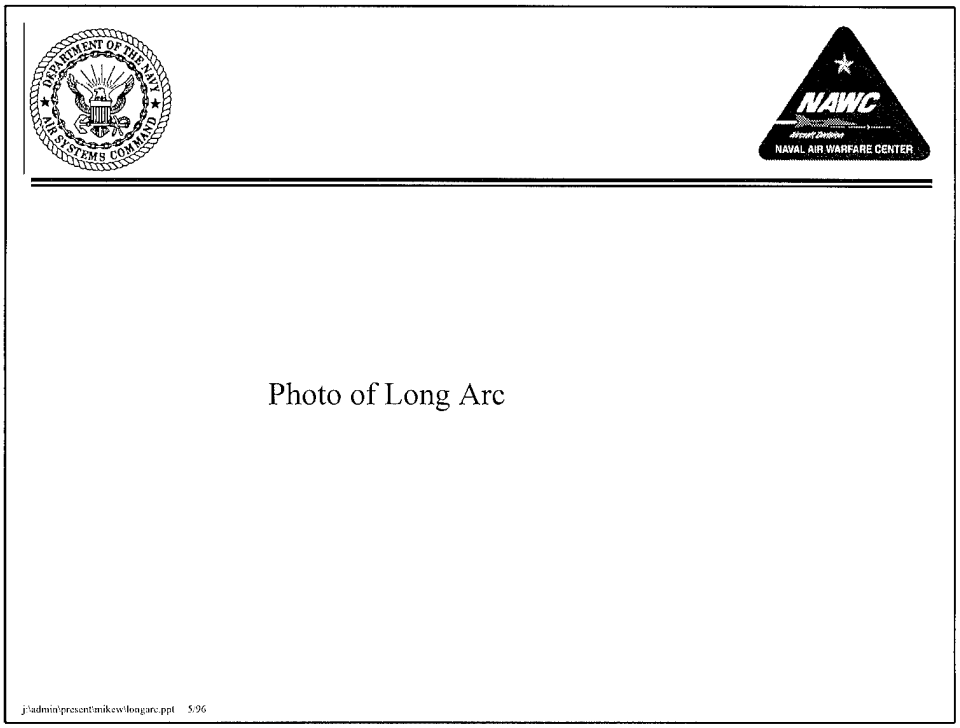
1. All design goals were achieved. Simulator is modular and easily reconfigured for the various waveforms.

2. The reliability has been extremely high, and the reliability issues associated with moving the system have not been a problem.

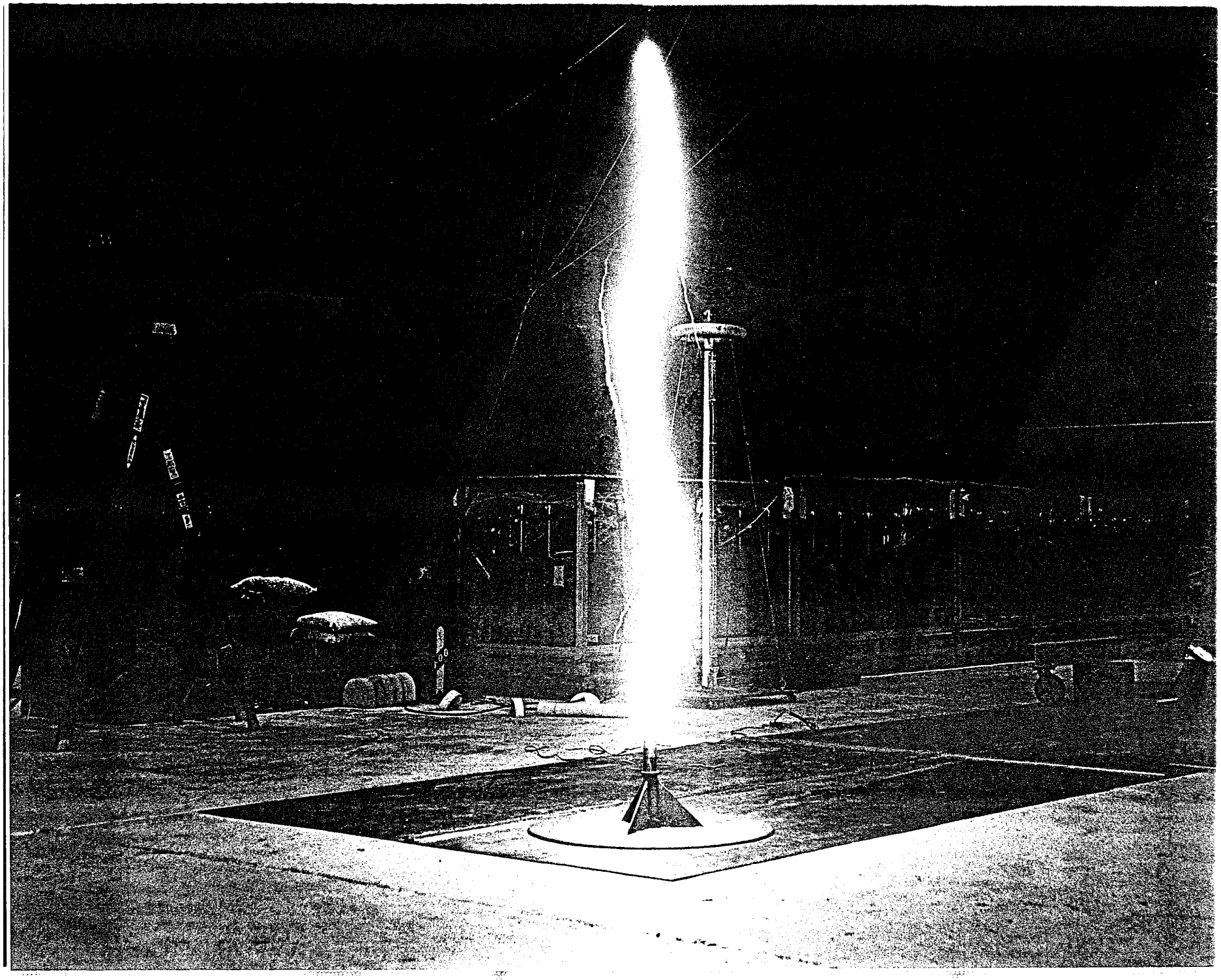


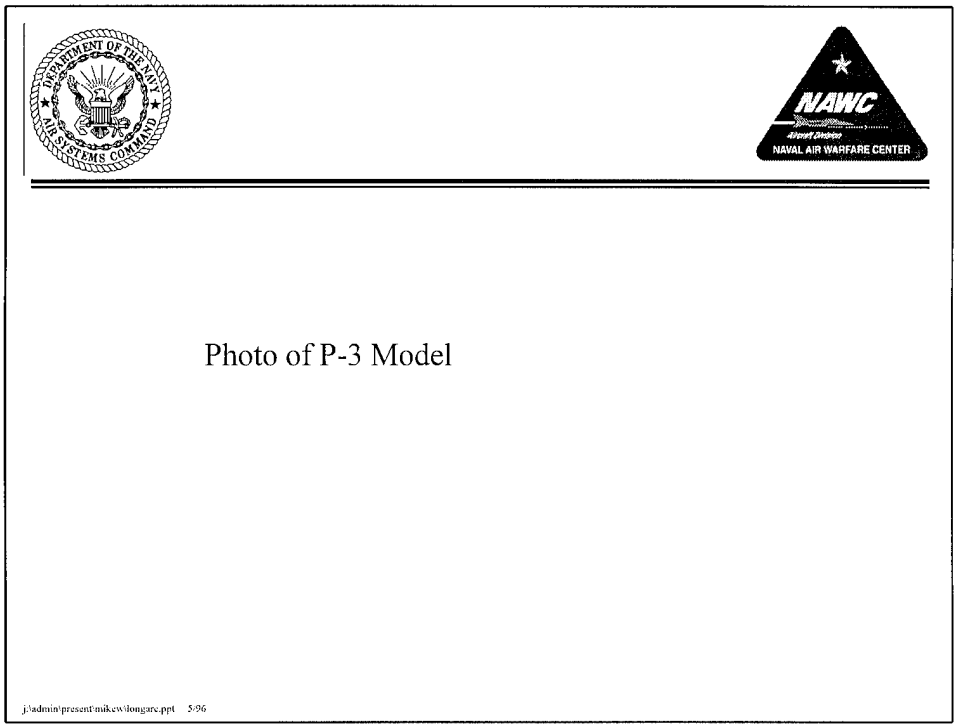
1. The Long Arc Lightning Simulator is a very versatile pulser for use during both the design and qualification of ground and air systems.

2. Among the more important applications ("Read from slide")

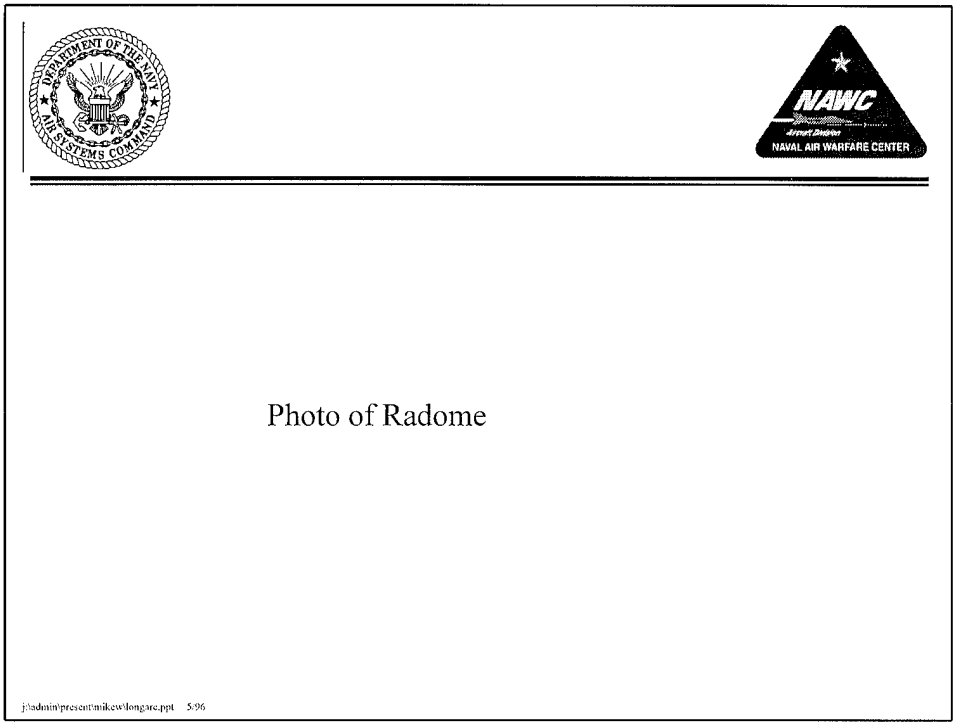


1. The simulator is capable of providing an arc 3-4 meters.

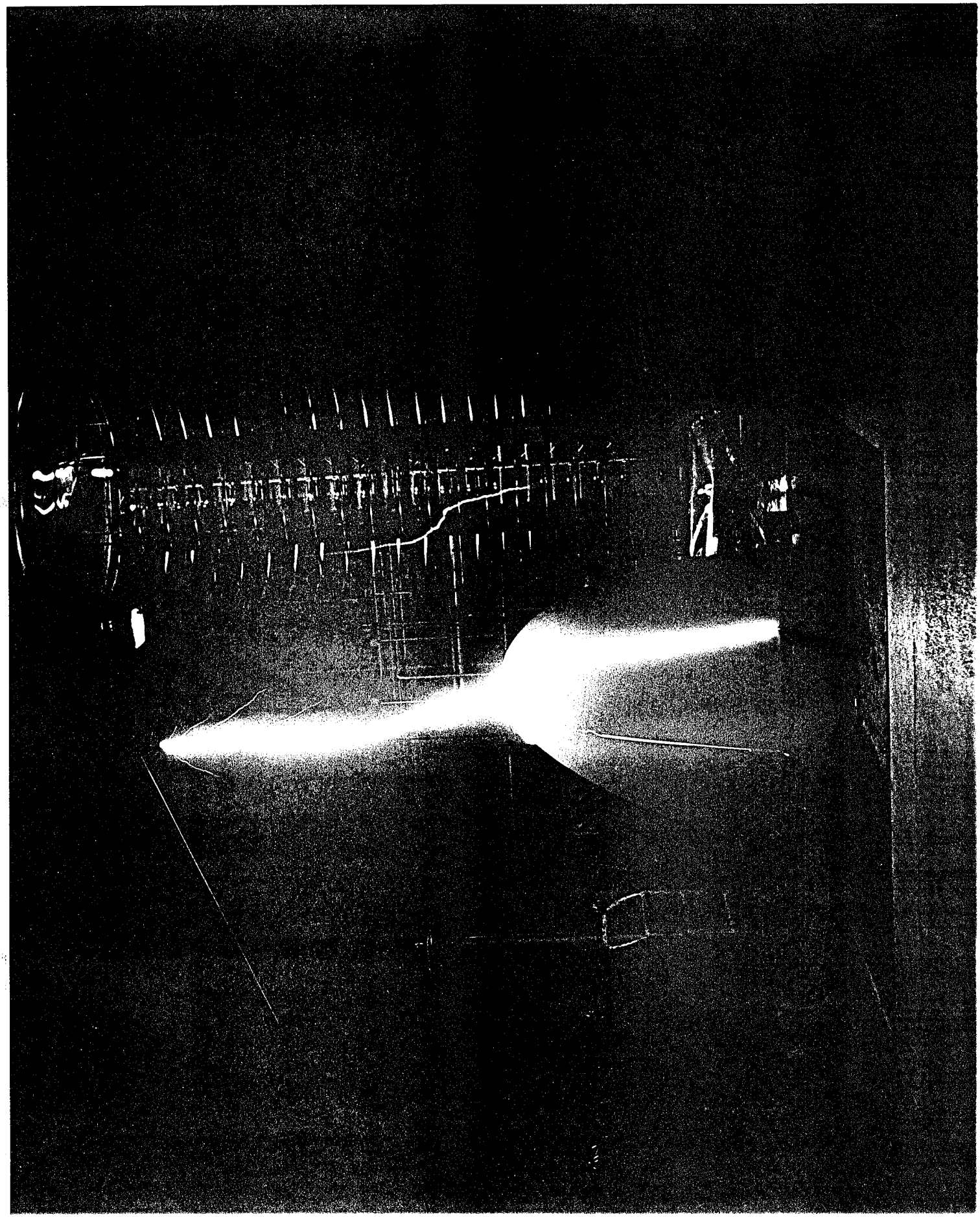


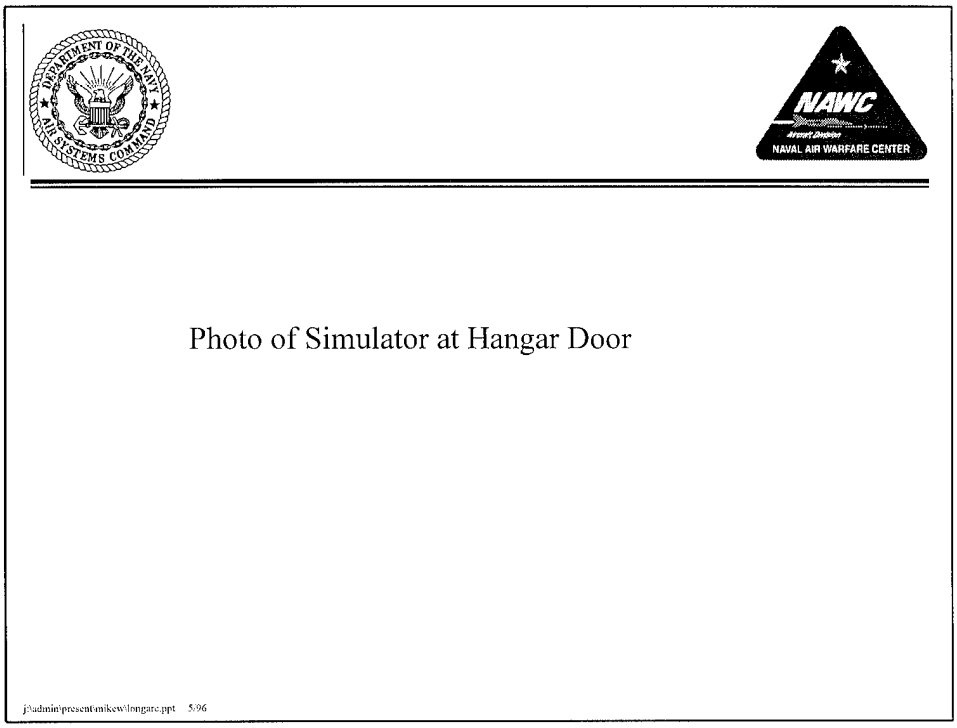


1. The simulator with it's Long Arc is capable of testing larger than normal test objects.

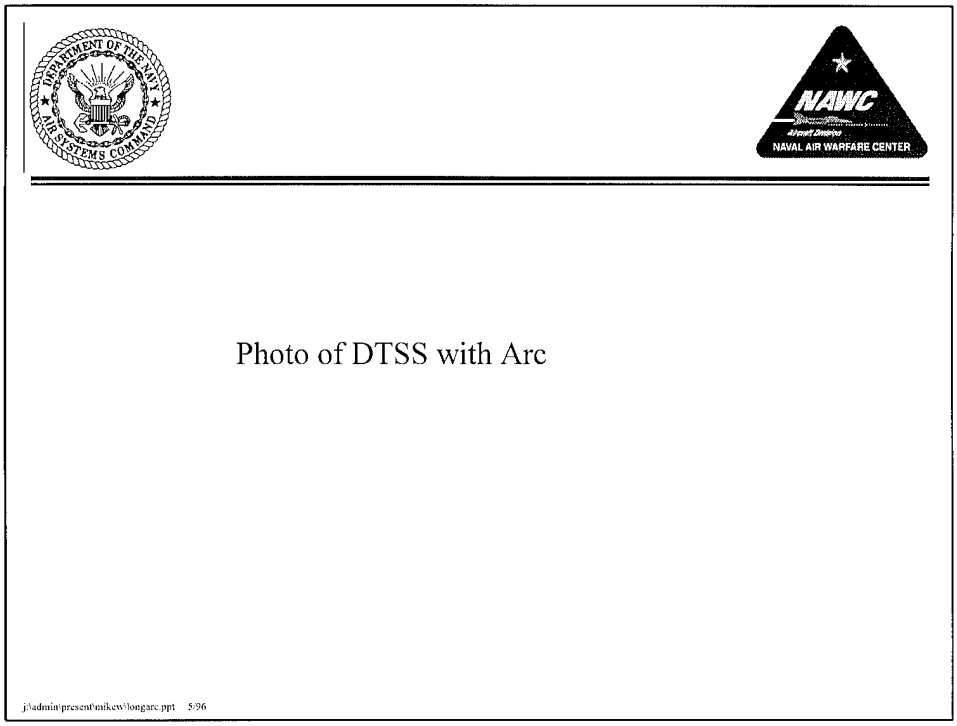


1. The photograph here demonstrates effective diverter strip placement an a large Radome.





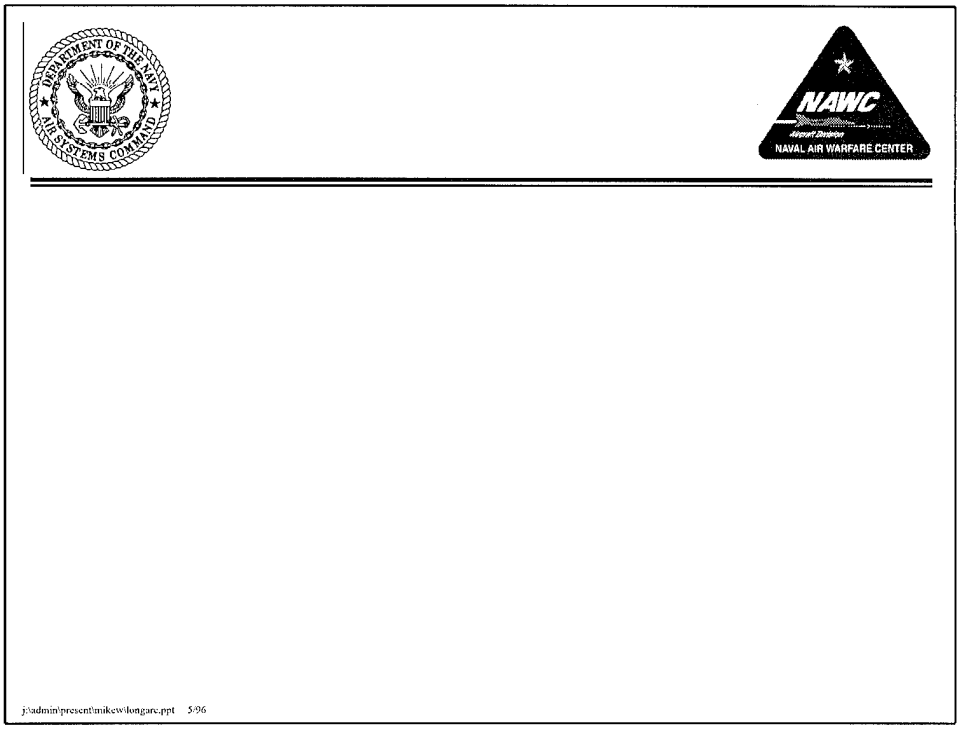
1. For a nearly Lightning Test, it becomes necessary to relocate simulator to the hangar door.



1. This photo demonstrates an Arc being produced to generate a E and H field to simulate nearby lightning.

2. This test method is very popular with the U.S. Army, particularly with ground based systems.

3. The Navy is considering this test method on some systems.



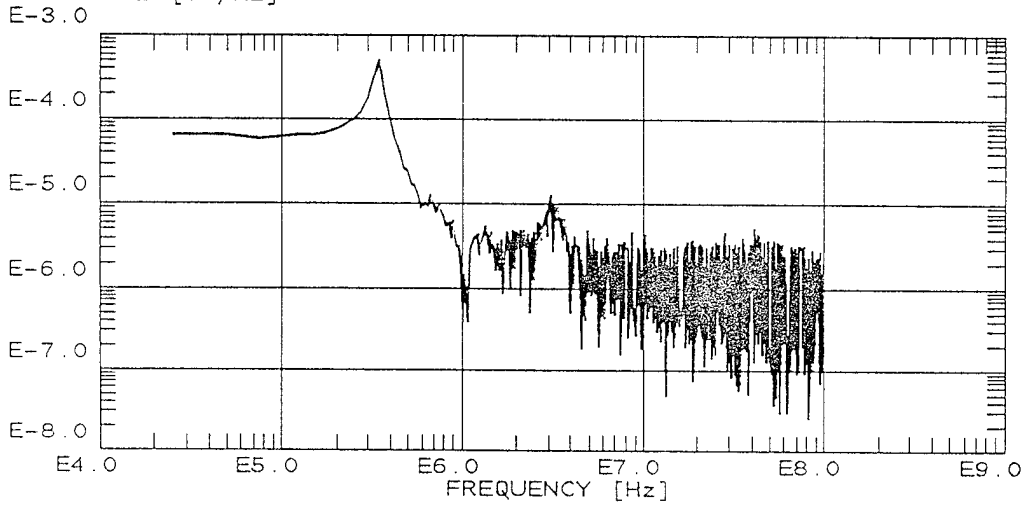
1. The pulser generates a vertically polarized electric field.

2. The fields inside the test volume were measured then the test object was placed in the volume.

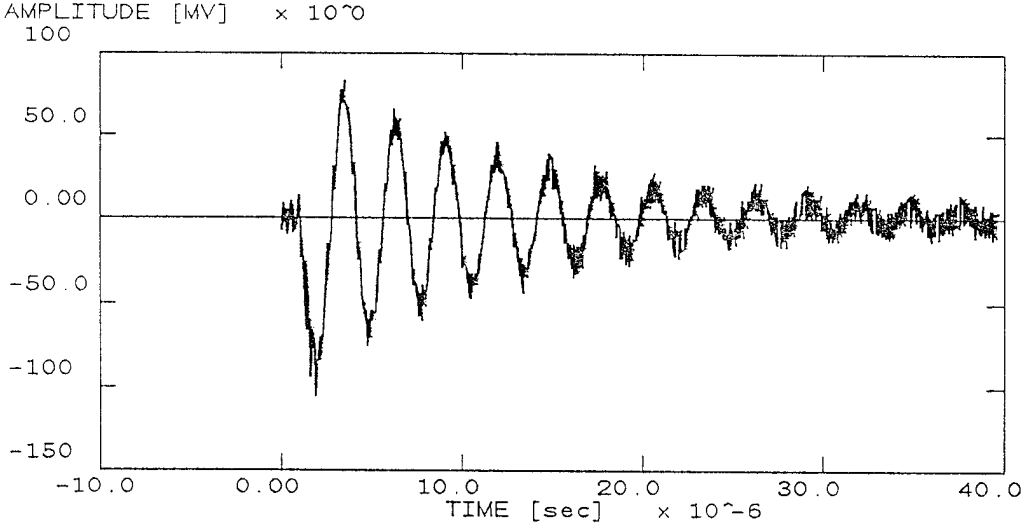
3. For example: @ 11 meters we consider the 19 KV/m measured field to be the equivalent of a 50 percentile cloud to ground strike at 80 meters.

RHX30003 REPEAT 13, CORRECTED DATA

30-JAN-96 16:46:08 FILE: PDAS_DATA:RHX30003.013



Test ID	LONG ARC FM
Experiment Number	2
Pulse Number	151
Pulse Date	25-JAN-1996 22:51:52
Ref Field [kV/m]	0.0000
Rise Time [sec]	0.0000
Measurement Type	HX
Measurement Priority	A
Probe type	MGL-2
Probe Eu Conv. factor	12.60 E-09
Transmitter Gain [db]	-6
Total Scalar Gain [db]	-56
Peak [MV]	-104.8 A/m
Peak Time [sec]	1.924 E-06
Signal/Noise Ratio [dB]	27



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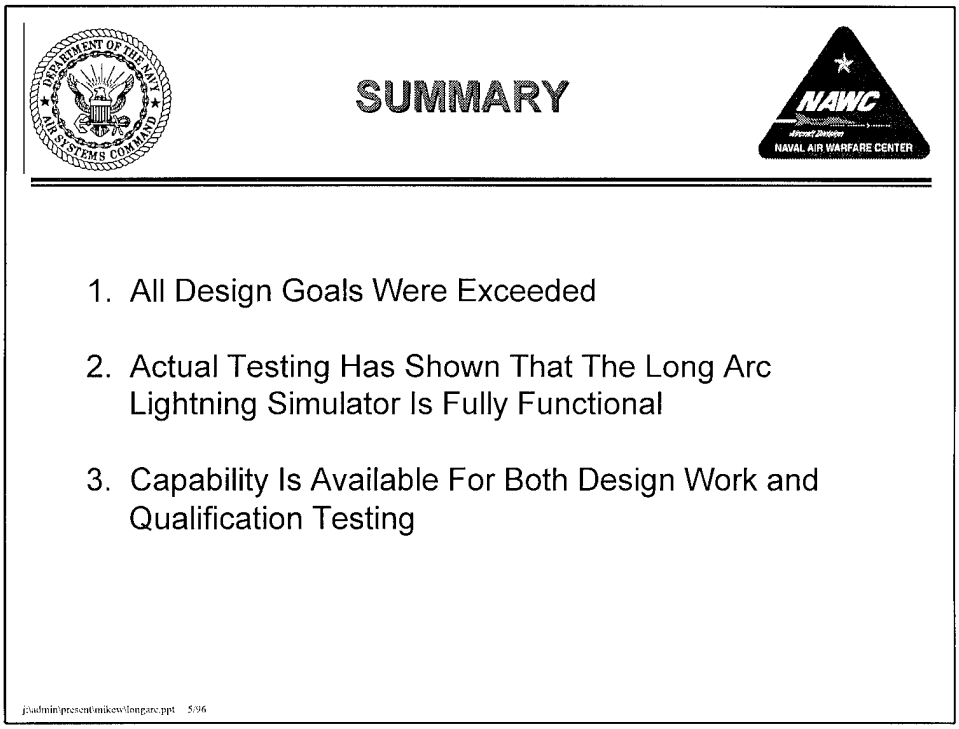

1. (Brief from slide)